ABSTRACT

A battery protection circuit is provided that includes a safety circuit and a charge monitoring circuit. The safety circuit monitors the voltage and current of at least one rechargeable cell within the battery pack, and disconnects the cell(s) from the external terminals of the battery pack when either the voltage becomes too high or low, or when excessive current is being drawn from the battery pack. The charge monitoring circuit can include any of a number of detectors or monitoring circuits, including those that monitor temperature, pressure, voltage, energy, current or power. In one embodiment, the charge monitoring circuit includes a power meter and a pulsed current detector. The charge monitoring circuit actuates when either the power or pulsed current exceeds a predetermined power or current threshold, respectively. When the charge monitoring circuit actuates, an overcurrent condition is simulated in the safety circuit. The overcurrent condition causes a disconnect switch to open, thereby disconnecting the cell(s) from the external terminals. The battery protection circuit then latches in this disconnected state until a load is removed from the terminals of the battery pack.